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FEDERAL COMMUNICATIONS COMMISSION
Washington DC 20554

JUN 1 5 1994

In the Matter of

Allocation of Spectrum
Below 5 GHz Transferred
From Federal Government
Use

ET Docket No. 94-32

TO: The Commission

COMMENTS OF
SYMBOL TECHNOLOGIES, INC.

1. Symbol Technologies, Inc. ("Symbol"), a major manufacturer of Part 15 spread spectrum data communications equipment, hereby submits these Comments in response to the Notice of Inquiry in the above-referenced proceeding.^{1/}

THE COMMISSION SHOULD NOT MAKE ALLOCATIONS AT 2402-2417 MHz THAT WOULD JEOPARDIZE SPREAD SPECTRUM OPERATIONS.

2. Spread spectrum radio transmitters under Part 15 of the Commission's Rules are authorized to operate at 2400-2483.5 MHz.^{2/} This band includes the frequencies at 2402-2417 MHz that NTIA proposes to transfer to the private sector.^{3/}

^{1/} Allocation of Spectrum Below 5 GHz, ET Docket No. 94-32, Notice of Inquiry, FCC 94-97 (released May 4, 1994) ("Notice").

^{2/} 47 C.F.R. § 15.247.

^{3/} Part 15 representatives have every right to be heard in connection with the Commission's allocation decisions, even though Part 15 operations are secondary to licensed services. 47 C.F.R. § 15.5. The Commission is required to allocate frequencies in the "public convenience, interest, or necessity." 47 U.S.C. § 303(c). As we show below, Part 15 operations are very much in the public interest and therefore must be taken into account.

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The Commission should not make allocations at these frequencies that would threaten spread spectrum operations.

A. Spread Spectrum Communications Make an Important Contribution to the U.S. Economy.

3. The Notice acknowledges the wide range of products and services made available through spread spectrum technology.^{4/} Since the Commission authorized spread spectrum under Part 15,^{5/} users have invested over \$400 million in Part 15 radio products for use in commercial facilities such as stores and warehouses, with a current annual growth rate in this market of 30 to 50 percent.^{6/} In addition, 35 responding gas and electric companies have already invested over \$139 million in automatic meter reading equipment at 902-928 MHz, and project an ultimate investment in this band of approximately \$663 million.^{7/} Part 15 spread spectrum technology is also used in a variety of consumer devices such as cordless telephones, wireless speakers,

^{4/} Notice at ¶ 6, n.14 (citing "a wide variety of communications services as well as services such as automated meter reading, inventory control, package tracking and shipping control, alarm devices, local area networks, and cordless phones").

^{5/} Spread Spectrum Systems, 101 F.C.C.2d 419 (1985).

^{6/} The market data derive from Symbol's own shipments divided by its market share.

^{7/} The responding companies are only a fraction of the gas and electric utilities providing service to the public nationwide. The survey results are preliminary and are provided to Symbol by the Utilities Telecommunications Council.

wireless headsets, wireless VCR-to-TV transmission, and long-range remote controls.^{8/}

4. Spread spectrum equipment is the fastest growing segment of the active and highly visible retail automation market; and more than 50% of all new installations of wireless data collection systems in all industrial sectors use spread spectrum. Commercial spread spectrum equipment automates tasks in real time, provides dramatic speed improvements, and increases accuracy. Typical applications include retail pricing, inventory control, and incoming receiving control; warehousing and distribution; tracking of raw materials, work in progress, and finished goods in manufacturing, as well as inventory control, production tracking, and quality assurance reporting; and tracking of shipments by package and parcel delivery providers, passenger airlines, the US Postal Service, and freight trucking. Many of these applications are invisible to consumers, but their impact shows up clearly at the checkout stand in the form of lower prices, as well as in the United States' competitive edge in global markets. The technology holds down production and distribution costs, reduces lost shipments and misplaced items, facilitates "just in time" inventory control for manufacturing and retail, and permits fast and flexible competitive responses to changing conditions.

^{8/} Despite a widely accepted consensus throughout the industry that the consumer market is large and growing very fast, Symbol has not been able to establish a reliable estimate of its size.

5. Other applications will soon change how American consumers shop. Fixed checkout lanes will become a relic of the past. Sales personnel in some stores already carry hand-held portable point-of-sale devices that "ring up" sales, read credit and debit cards and process approvals, confirm and update inventory, manage back-orders and special orders, and generally handle all the non-cash functions of a fixed checkout position through spread spectrum communications. Other stores use portable cash registers that are quickly and easily rolled to where they are needed and communicate with the pricing computer over a spread spectrum link.

6. Spread spectrum technology is also helping to improve performance and hold down costs in the health care industry. Some hospitals bar-code not only their inventory -- which can rival that of a substantial retail outlet -- but also each patient's ID bracelet. They can create accurate bills at very low cost simply by using a hand-held device to scan each item as it is used, as well as the patient's bracelet. A hospital-wide spread spectrum system relays both codes to a central computer where they are interpreted and paired for later billing. Some hospitals also bar-code each dose of medication and require the nurse to scan both the medication and the patient's bracelet before administering the dose. Thanks to spread spectrum communications, an alarm sounds if the medication and dosage are not right for that patient at that time, or if the computer detects a possible drug interaction problem. While the current

debate on health care has helped many Americans understand that administrative expenses are a significant factor in escalating health care costs, Part 15 spread spectrum technology offers a fully practical way of keeping those expenses down while maintaining or improving the quality of patient care.

7. Finally, spread spectrum communications equipment helps to create American jobs. All of Symbol's Part 15 spread spectrum products are manufactured entirely in the United States; and Symbol is very confident that the domestic content of the parts used in manufacturing its products is at least 50%, and may be much higher. To the best of Symbol's knowledge, the experience of its major competitors is comparable.

B. Both the Public and the Commission Are Well Served By the Part 15 Regulatory Regime.

8. Shared, unlicensed frequency use under Part 15 has been highly successful, particularly with the advent of spread spectrum technology. Well-engineered Part 15 devices are designed to function properly in an unlicensed environment: While operating within FCC-prescribed limits, they can still accept a reasonable amount of interference without diminishing their capacity to boost users' productivity. Such devices are able to tolerate incoming interference not only from other Part 15 users and ISM equipment but also from licensed amateur operators and Government radiolocation operations.

9. The ability of diverse users to coexist under Part 15 not only has directly benefited many industries and citizens but

also has advanced the goals of the Commission itself. Equipment is easily available and is responsive to customers' needs. The Commission's only regulatory burden is the straightforward process of equipment certification; there is no need to grant and renew licenses, conduct lotteries or auctions, maintain license databases, or resolve quarrels among licensees. Perhaps most important, even a radical technological advance can reach the marketplace quickly, without the lengthy delays required for a Commission rule making. Manufacturers can introduce innovative technologies as fast as they can obtain certifications; and providers can offer new services as fast as the equipment becomes available. In many respects the Part 15 regulatory environment approaches the ideal -- while leaving development and deployment decisions in the hands of the users and the marketplace, it nonetheless effectively protects the public from the effects of harmful interference.

C. The Commission Should Not Threaten 2400-2483.5 MHz Spread Spectrum Operations Through Its Allocations at 2402-1417 MHz.

10. Spread spectrum communications are very successful at sharing spectrum with conventional communications. A spread spectrum transmission distributes its energy over a relatively wide band of frequencies, so that very little energy intrudes into the frequency band of a conventional transmission. This characteristic renders the spread spectrum transmission largely invisible to conventional radio communications, and vice versa.

As a consequence, spread spectrum and conventional communications very rarely interfere with one another.^{9/}

11. But there is an exception: Receivers for certain types of wideband signals are potentially vulnerable to interference from Part 15 transmitters.^{10/} This issue arose recently in the 902-928 MHz band, where most spread spectrum equipment operates today.^{11/} Like the 2400-2483.5 MHz band, 902-928 MHz is shared with other Part 15 users, ISM equipment, amateur operators, and Government radiolocation operations. Beyond those, however, 902-928 MHz is also home to the interim Automatic Vehicle Monitoring ("AVM") service.^{12/} In PR Docket No. 93-61, the Commission proposed to expand AVM into a new Location and Monitoring Service ("LMS").^{13/} Many spread spectrum manufacturers and users, including Symbol, have filed comments and ex parte statements in that docket warning that wideband LMS technology is extra-

^{9/} Under Commission regulations, spread spectrum technology must not interfere with, and must accept any interference from, licensed radio communications. See 47 C.F.R. § 15.5. To the best of Symbol's knowledge, no licensed user has ever had to ask the Commission to enforce this provision against a spread spectrum user.

^{10/} Interference the other way, from licensed wideband transmitters to spread spectrum receivers, is not reported to be a problem.

^{11/} Notice at ¶ 6, n.14.

^{12/} 47 C.F.R. § 90.239.

^{13/} Automatic Vehicle Monitoring Systems, 8 FCC Rcd 2502 (1993).

ordinarily susceptible to interference.^{14/} Their concern arises from the right of an LMS operator under Section 15.5 to require an interfering spread spectrum user to cease operations. This controversy has not yet been resolved.


12. Symbol requests that the Commission take modest precautions now to avoid similar contention in the future at 2400-2483.5 MHz. Several spread spectrum devices are already certified to operate in that band. Regardless of the outcome in PR Docket No. 93-61, the use of 2400-2483.5 MHz for spread spectrum communications is very likely to increase in the future, as the Commission has recognized.^{15/} In view of the importance of spread spectrum communications to the nation's economy and the

^{14/} At least one would-be LMS provider concurs. "Any outdoor Part 15 device, within 3.6 miles of an LMS receiving site could desensitize that site by 20 dB. *This is very significant interference and is potentially disastrous for the LMS system.*" Further Comments of MobileVision, L.P., Annex 2 at 23 (filed March 15, 1994) (emphasis added). The same document reports on the substantial interference potential of indoor Part 15 systems.

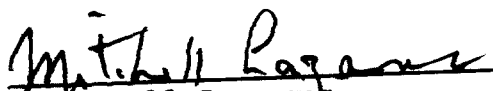
^{15/} Notice at ¶ 6, n.14.

regulatory efficiency of unlicensed operation, the Commission should authorize services at 2402-2417 MHz that are compatible with Part 15 spread spectrum operations -- which include virtually all conventional narrowband services -- and should refrain from authorizing services that cannot withstand even the very slight interference potential of Part 15 spread spectrum operations.

Respectfully submitted,


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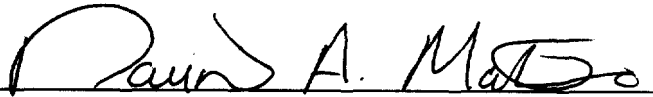
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Counsel for
Symbol Technologies, Inc.

June 15, 1994

VERIFICATION

I have read the foregoing Comments of Symbol Technologies, Inc. in ET Docket No. 94-32. I declare under penalty of perjury that the facts stated therein are true and correct to the best of my knowledge and belief. Executed on June 14, 1994.

A handwritten signature in black ink, appearing to read "Raymond A. Martino". The signature is written in a cursive, flowing style with a horizontal line underneath.

Raymond A. Martino
Director RF Engineering
Symbol Technologies, Inc.